Life and Physical Sciences
Texas A&M University
Core Curriculum Cover Sheet
Initial Request for a course to be included in the Fall 2014 Core Curriculum

1. This request is submitted by (department name): Animal Science Department

2. Course prefix and number: ANSC 107

3. Texas Common Course Number: AGRI 1319

4. Complete course title: General Animal Science

5. Semester credit hours: [__] 3

6. This request is for consideration in the following Foundational Component Area:
   [ ] Communication
   [ ] Mathematics
   [ ] Life and Physical Sciences
   [ ] Language, Philosophy and Culture
   [ ] Creative Arts
   [ ] American History
   [ ] Government/Political Science
   [ ] Social and Behavioral Sciences
   [__] CURRENT CORE: No

7. This course should also be considered for International and Cultural Diversity (ICD) designation:
   [ ] Yes
   [ ] No

8. How frequently will the class be offered? Spring, Summer and Fall

9. Number of class sections per semester: 2 - 4

10. Number of students per semester: 300 (Spring) 50 (Summer) 650 (Fall)

11. Historic annual enrollment for the last three years: 984 1008 1012

This completed form must be attached to a course syllabus that sufficiently and specifically details the appropriate core objectives through multiple lectures, outside activities, assignments, etc. Representative from department submitting request should be in attendance when considered by the Core Curriculum Council.

13. Submitted by: [Signature] W. Ramsey
   Date: 6/2/13

14. Department Head: [Signature] [Signature]
   Date: 5/24/13

15. College Dean/Designee: [Signature] [Signature]
   Date: 6/3/13

For additional information regarding core curriculum, visit the Texas Higher Education Coordinating Board website at www.thecb.state.tx.us/corecurriculum2014

See form instructions for submission/approval process.
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Initial Request for a Course Addition to the Fall 2014 Core Curriculum

Foundational Component Area: Life and Physical Sciences

In the box below, describe how this course meets the Foundational Component Area description for Life and Physical Sciences. Courses in this category focus on describing, explaining, and predicting natural phenomena using the scientific method. Courses involve the understanding of interactions among natural phenomena and the implications of scientific principles on the physical world and on human experiences.

The proposed course must contain all elements of the Foundational Component Area. How does the proposed course specifically address the Foundational Component Area definition above?

ANSC 107 General Animal Science explores the basic biological principles of each livestock species by furthering the student’s understanding of topics such as anatomy, growth, genetic selection, environmental and human impacts on the production of livestock and food, meat science, animal health, reproductive physiology, and digestive physiology. Utilizing the scientific method, the fundamental science of each topic is developed within each species (beef cattle, dairy cattle, horses, poultry, swine, sheep and goats) in context with marketing and production forces. Gaining a thorough understanding of the animal sciences will help students analyze the livestock industry challenges and formulate responses. In response to these problem solving events, practical application and technological implementation is developed.

Core Objectives

Describe how the proposed course develops the required core objectives below by indicating how each learning objective will be addressed, what specific strategies will be used for each objective and how student learning of each objective will be evaluated.

The proposed course is required to contain each element of the Core Objective.

Critical Thinking (to include creative thinking, innovation, inquiry, and analysis, evaluation and synthesis of information):

How Addressed
Students will develop critical thinking skills through synthesis of the information in relation to 1) the causes and affects of animal diseases, 2) reproductive difficulties, 3) nutritional requirements and 4) animal breeding (genetic selection).

Strategies
Each topic will begin with scientific background, followed by how this relates to environmental and/or biological effects, then practical applications. Examples would be:
Lectures on animal breeding would begin with the general facts about each of the physiological and behavioral characteristics about breeds. Sample topics would include maternal proclivity, rate of growth, degree of heat tolerance and immune resistance. Subsequent discussions and examinations would then utilize this information as a basis for analyzing which breed of animal would be best suited for a specific region with known conditions considering the given attributes of that breed. Further, the class would use the application of this foundational knowledge to innovate outline breedings and management strategies in order to generate hybrid vigor and optimize animal performance. Another example lecture would be the presentation of basic endocrinological principles. As example, students will be instructed on the basal mechanisms of hormone action as they relate to reproductive biology. The class would then be engaged in thought provoking scenerios that pose queries challenging the students to interpret scientific data (such as circulating hormone levels) for use in real world scenarios. An example, would be the question: "Progestrone is present at a high level in the blood of a doe on day 31 post ovulation. Is she pregnant?" Students would then have to utilize the given information in the appropriate context in order to come to a scientifically
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supported conclusion. Moreover, translational application of the course materials will also be integrated as the class will explore current reproductive technologies and develop strategies for potential manipulation of hormone cycles in livestock species. Students will be requested to provide innovative responses to the challenges and inquiries animal agriculture will face in the future. Another pillar of the course materials is a focus on nutritional biology. Specifically the nutritional value and purpose of a feedstuff will be presented, along with disorders and disfunctions associated with toxicities and deficiencies involved with each major nutritional requirement. Symptoms of abnormal activity would be revealed to the class, and the students would be expected to provide solutions to the problem after analyzing the animal's diet. Students will also be given information regarding an animal's stage of production and be prompted to provide the nutritional components of a diet, which would be most suitable during that phase. Additionally, the class would also analyze the physiological and environmental factors which influence, promote and inhibit animal growth and development. A general understanding of the interaction of breed physiology and behavior as influenced by genetype, endocrinology, and nutrition will provide the class a basis of knowledge of the collective influences on animal production and performance.

How Evaluated
Scenarios will be presented on exams in order to test the extent to which each student understands and is able to apply the material presented in lecture, and subsequently generate at an appropriate solution for the query given. Scenarios presented will vary from production oriented to occupation specific (i.e. veterinarian, A.I. specialist, feedlot manager, etc.) as to encompass the breadth of information disseminated in the lectures.

Communication (to include effective development, interpretation and expression of ideas through written, oral and visual communication):

How Addressed
The course will have a note packet which will provide the students with all of the lecture presentations as well as supplemental pictures and labeled diagrams. Active learning is used in almost all lectures, which includes extensive question and answer dialogue with students during the class. Students will be asked critical thinking type questions throughout each lecture and will be expected to formulate a response (including both written and oral) to best describe how and why they would address the questions provided in their respective individual manners.

Strategies
Students are always prompted to ask questions and provide solutions to the questions asked during class. Students will be asked thought provoking, situation-type questions throughout each lecture in order to stimulate dialogue with the instructor during class. The class will also be asked random questions throughout lecture which will provide feedback on the level of understanding for the majority of the class while maintaining student interaction and classroom engagement. Another strategy that will be utilized to achieve communication in the class is “ask your neighbor time.” A question, statement or mechanistic principle will be provided to the class, and students will be allowed to converse with their neighbor in order to either dispute or agree on an answer or explanation. Individuals throughout the room will then be expected to provide their conclusion and be open for discussion based upon it. This strategy will be implemented to keep the class engaged throughout the lecture and will also provide the students an opportunity to demonstrate their mastery of the subject matter by teaching one another. In addition to “ask your neighbor time,” whole brain teaching methods will be applied. This strategy will enhance the visual communication amongst the class. For example, by connecting a specific term to a gesture, the class will be actively engaged in order to make the gesture each time the term is stated. To encourage further scientific knowledge and aptitude, students will be asked to do supplemental readings which will promote professional development as animal scientists. Students will utilize the American Journal of Animal Science's free membership offer for undergraduate students where they will be able to access journal articles, symposia archives, and public policy documents (www.asas.org). Reports and group projects will be geared to the style and format of professional documents and presentations at ASAS venues. Students will also be required
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to complete journal or blog entries on the eCampus forum section in order to monitor the individual progress students are making with the material as well as each one’s advancement in communicative skills. In addition to these written and verbal components, the class will be expected to create a hormone flow chart demonstrating the cause and effect events of the endocrine system in the female. They will also be provided with different teaching aids such as equipment or preserved reproductive and digestive tracts in order to enhance the learning experience as the instructor traces the steps of embryo transfer and the process of digestion in a ruminant animal. Short video clips of production systems will allow students to take “virtual tours” of animal systems around the nation. 

How Evaluated  
Many of the conclusions reached in class will appear on an exam type material, and the student will be expected to provide the answer which was generated by classroom at the end of the discussion time. Students will also be evaluated on the professional content and format accuracy of each report. Students will also be asked to turn in a sheet of paper with their response before and after the discussion in order to record progressive changes in thought and level of development in the discussion. In addition, students will be required to complete journal or blog entries on the eCampus forum section in order to monitor the individual progress students are making with the material as well as each one’s advancement in communicating the material. Moreover, undergraduates will be evaluated based on their oral responses and written responses submitted on pop quizzes, tests or via eCampus. 

Empirical and Quantitative Skills (to include the manipulation and analysis of numerical data or observable facts resulting in informed conclusions):  

How Addressed  
Each day professionals such as livestock managers, food processors, nutritionists, and veterinarians make decisions based upon numerical (census), financial, or physiological data; therefore, students must achieve the knowledge and level of understanding to make profitable and ethical decisions when they enter the professional workforce. Students will acquire the skills necessary to effectively analyze data and further develop an accurate conclusion based upon facts such as breeding evaluation data via utilization of EPD’s, market classifications and grades as well as diagnostic assessment of hormone levels and nutrient content of a particular feedstuff. 

Strategies  
Lectures will include the analysis of numerical data sets which are in support of the understanding of a specific topic. Sample lectures would include:  

Evaluation of Expected Progeny Differences (EPD’s) will allow for interpretation of the data for specific heritable traits as well as predictions of the best sire to use in a given scenario. Carcass data traits will be examined and conclusions will be drawn in relation to the current market trends. Marbling score in conjunction with yield grade are traits upon which the market commonly emphasizes. Value determining traits, such as these, will also be discussed along with the impact of changes to the product in these specific quantitative areas. Students will also be expected to describe the correlation of differing numerical traits and the price margins. Another lecture will cover the topic of nutrient requirements in livestock and analysis of feedstuffs. Students must process statistical information and come to an informed decision or solution as to what to feed in order to maximize profits. For example, the digestibility and passage rate of a particular feedstuff alludes to the quality of a feedstuff and affects the rate of growth or efficiency of the individual to which it was fed. The class will also decipher hormone levels in accordance with the established profiles of certain stages of development, leading to the control of physiological phenomena in livestock species. The class will also be expected to utilize such information in order to predict the effectiveness and method of hormonal manipulations for breeding purposes.  

How Evaluated  
Numerical data will be given on exams and quizzes along with a scenario or situation. The students will be evaluated based upon the correct interpretation of the data and rationale for the answer/solution provided.
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Teamwork (to include the ability to consider different points of view and to work effectively with others to support a shared purpose or goal):

How Addressed
The majority of the team work employed in this class is attributed to hands-on models, group interpretations, and peer explanation of a specific lecture topic.

Strategies
Lectures will present challenges to students’ full understanding of various topics in Animal Science and are designed in order to provoke thoughtful responses after peer collaboration. Examples include:
Formulating a report with viable solutions constituted by valid research and citations in response to “hot topics” facing animal agriculture. Creating a hormone flow chart that specifies the endocrine gland or cell where specific hormones are produced, upon what tissue targets the hormone acts, and the mechanism of regulation. Students are encouraged to make their own study materials and have them revised by peers. This ensures optimal achievement of comprehension for each student during their learning experience. Also, during the lecture over meiotic division and independent assortment, volunteers from the class are expected to pose as model pieces to the overall concept by acting as chromosomes and groups of cells. The same approach is used to further develop the understanding of hormone signals and regulation. Student volunteers act as a model of the female reproductive tract and communication system as they are assigned structures and specific hormones. Next, they are instructed to “send the appropriate signals” to achieve the desired event (ovulation, formation of a corpus luteum (CL), luteinization of the CL, etc.). The instructor will prompt the class to congregate into their teams which are divided by each row within the class and complete the bonus assignment. These assignments will be based off of a lecture topic and will probe the class to partake in activities such as drawing out and labeling a diagram, comparing and contrasting the benefits of a symbiotic relationship, and providing innovative solutions to problems an industry is facing.

How Evaluated
For some projects, the class will be evaluated as a whole based upon participation in class discussion. Other smaller and more deliberate projects, group members will submit a paragraph to eCampus along with the project describing the contribution level of each of the other members, giving them an overall teamwork score. In smaller class sections, the students will also be evaluated on the quality of the team’s flow charts in relevance to the grading rubric.

Please be aware that instructors should be prepared to submit samples/examples of student work as part of the future course recertification process.
Fall 2013 Course Syllabus
General Animal Science – ANSC 107-502
T/R 9:35-10:50 – Kleberg Building – Room 115

Professor: Dr. Shawn Ramsey
Associate Professor
Office: 109 Kleberg
Phone: 979-845-7616
Email: sramsey@tamu.edu

Required Text: ANSC 107 Class Notes, MSC only
Optional Text: Scientific Farm Animal Production, Taylor, (any edition)
Course Description: Introductory Animal Science will provide students with a general understanding of all aspects of the livestock industry. The class will start with basic agriculture nomenclature of breeds, species and types of livestock then progress to cover reproduction, nutrition, genetics, food safety, growth and development of beef cattle, sheep, horses, swine, dairy cattle and poultry. The class will also cover a brief description of the companion animal industry.

Grading Policy: Grades will be based upon the following:
Posted Quizzes-4 (25 pts. each) 100 points
Surveys of Knowledge – 4 400 points
Without final total 500 points
Comprehensive Final (optional based on absences) 100 points
With final total 600 points

The standard grading procedure percentage scale will be used:
(90 and above = A, 80-89 = B, 70-79 = C, 60-69 = D, and below = F)

Assessment of Teamwork:
Bonus points will be awarded based on completion and participation of teams. Teams will be designated by rows within the classroom.

Attendance Policy:
The FINAL SURVERY OF KNOWLEDGE is optional for those students who have PERFECT attendance. Students with more than 6 unexcused absences will lose 2 percentage points off their final average for each additional unexcused absence. University Policy-Make ups. If you require a make-up exam, this will only be possible if your reason for missing class is due to a properly documented and reported university excused absence in accordance with Texas A&M University Student Rule 7. To be excused the student must notify his or her instructor in writing (acknowledged email is acceptable) prior to the date of absence if such notification is feasible. In cases where advance notification is not feasible (e.g. accident or emergency) the student must provide notification by the end of the second working day after the absence. This notification should include an explanation and written documentation of why notice could not be sent prior to the class. I will need to keep a copy of your documentation. In this and all other areas, we follow university policy. Make-up quizzes will be given, but you are only eligible if the absence is University excused. Make-up quizzes will be filled in the blank, and short answer format. Please see www.student-rules.tamu.edu for more information on attendance policy.

Americans With Disabilities Act (ADA) Policy Statement
The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact Disability Services, in Cain Hall, Room B118, or call 845-1637. For additional information visit http://disability.tamu.edu

“Aggies do not lie, cheat or steal, nor do they tolerate those who do.”
Lecture Outline
ANSC 107-502
Fall 2013

Date:
Tuesday, August 27
Thursday, August 29
Tuesday, September 3
Thursday, September 5
Tuesday, September 10 *
Thursday, September 12

Subject:
International Agriculture
Breed of Livestock and General Terminology
Consumer Driven Product
Livestock Production Systems – Vertical Integration
Livestock Production Systems – Beef and Dairy Cattle
Livestock Production Systems – Sheep and Goats

Tuesday, September 17

Thursday, September 19
Tuesday, September 24
Thursday, September 26
Tuesday, October 1
Thursday, October 3 *
Tuesday, October 8

**SURVEY OF KNOWLEDGE I**

Classification Standards and Grades for Market Animals
Basic Meat Science
Microorganism Contamination of Food
Animal Health and Welfare Practices
Evaluation of Breeding Animals
Basic Genetics of Livestock

Thursday, October 10

Tuesday, October 15
Thursday, October 17
Tuesday, October 22
Thursday, October 24
Tuesday, October 29 *
Thursday, October 31

**SURVEY OF KNOWLEDGE II**

Female and Male Reproductive Anatomy
Hormone Mechanisms and Physiology
Artificial Insemination/Estrus Synchronization
Embryo Transfer and Advanced Technologies
Management for Reproductive Efficiency
Environmental Physiology and Thermoregulation

Tuesday, November 5

Thursday, November 7
Tuesday, November 12
Thursday, November 14
Tuesday, November 19 *
Thursday, November 21
Tuesday, November 26
Thursday, November 22

**SURVEY OF KNOWLEDGE III**

Ruminant and Monogastric Anatomy
Physiology of Digestion
Evaluation of Nutrients and Feedstuffs
Balanced Livestock Diet
Companion Animal Science
Companion Animal Science
Thanksgiving Break

Thursday, November 29
Tuesday, December 4

**SURVEY OF KNOWLEDGE IV**
Redefined day (attend Thursday classes)

Friday, December 6
12:30-2:30

(**) denotes dates when quizzes will be given
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Initial Request for a course to be considered for the Fall 2014 Core Curriculum

1. This request is submitted by (department name): Soil & Crop Sciences

2. Course prefix and number: SCSC 301

3. Texas Common Course Number: NA

4. Complete course title: Soil Science

5. Semester credit hours: 4

6. This request is for consideration in the following Foundational Component Area:
   - [ ] Communication
   - [ ] Mathematics
   - [X] Life and Physical Sciences
   - [ ] Language, Philosophy and Culture
   - [ ] Creative Arts
   - [ ] American History
   - [ ] Government/Political Science
   - [ ] Social and Behavioral Sciences

7. This course should also be considered for International and Cultural Diversity (ICD) designation:
   - [ ] Yes
   - [X] No

8. How frequently will the class be offered? Fall, spring, summer

9. Number of class sections per semester: 6

10. Number of students per semester: 103

11. Historic annual enrollment for the last three years: 259 264 319

   This completed form must be attached to a course syllabus that sufficiently and specifically details the appropriate core objectives through multiple lectures, outside activities, assignments, etc. Representative from department submitting request should be in attendance when considered by the Core Curriculum Council.

12. Submitted by:
   
   [Signature]
   Course Instructor
   
   Date: 8/12/2013

   Approvals:
   
   [Signature]
   Date: 8/15/13

   Department Head
   
   [Signature]
   Date: 8/15/13

   College Dean/Designee
   
   [Signature]
   Date:

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See form instructions for submission/approval process.
Texas A&M University

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Initial Request for a Course Addition to the Fall 2014 Core Curriculum

Foundational Component Area: Life and Physical Sciences

In the box below, describe how this course meets the Foundational Component Area description for Life and Physical Sciences. Courses in this category focus on describing, explaining, and predicting natural phenomena using the scientific method. Courses involve the understanding of interactions among natural phenomena and the implications of scientific principles on the physical world and on human experiences.

The proposed course must contain all elements of the Foundational Component Area. How does the proposed course specifically address the Foundational Component Area definition above?

Soil Science, SCSC 301, describes and explains the natural phenomena of the nature and properties of soils. It uses these descriptions and explanations to predict soil formation and changes brought about to soils due to man’s manipulations and environmental conditions and changes. It is fundamental to Life and Physical Sciences because almost everything that we eat, drink, wear, and construct is either from the soil or on the soil. Soil Science advances the scientific principles of soil properties on the physical world and on human experiences over geologic and modern time. It develops additional language and facts of soils related to soils as a natural body having the combined effects of climate and biological activity, as modified by topography, acting on parent material over time. The learning objectives of this class include:

1. Describe and quantify fundamental soil physical, chemical, biological and mineralogical properties and the explanation of how these properties impact natural and agricultural ecosystems;
2. Describe and predict the formation of soils as they relate to their environment, their description, and their classification;
3. Define and describe the role of soils in infiltration, percolation, and storage of water;
4. Explain the role of macro- and micro-organisms in soil, their function and their requirements; and
5. Identify and describe of the biogeochemical cycles of soil-provided plant essentials nutrients.

Core Objectives

Describe how the proposed course develops the required core objectives below by indicating how each learning objective will be addressed, what specific strategies will be used for each objective and how student learning of each objective will be evaluated.

The proposed course is required to contain each element of the Core Objective.

Critical Thinking (to include creative thinking, innovation, inquiry, and analysis, evaluation and synthesis of information):

Basic concepts of soil science will be presented in lecture and demonstrated in the laboratory exercises. Students will utilize the basic concepts with creative thinking to make interpretations about different scenarios presented in lecture, laboratory, and the soil pit during the field trip. Students will use innovative and up to date technology, such as Web Soil Survey, to analyze, evaluate, and synthesize information to make interpretations about the potential uses of the site they collected their soil sample from that is used in the laboratory and the soil pit. Their critical thinking will be evaluated through exams and daily quizzes in lecture, weekly quizzes in lab, two written reports, one from the analysis and evaluation of the soil pit and one based upon their collected soil sample, and one oral report based upon their final soil sample report.

Communication (to include effective development, interpretation and expression of ideas through written, oral and visual communication):
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Students will be required to synthesize and interpret concepts presented in lecture and laboratory exercises and write two summary lab reports for grades. Visual evaluations and interpretations will be made on the field trip in the soil pit and surrounding landscape to make predictions of the suitability of the soil and site for structures such as buildings and roads, septic systems, and potential for growing different crops. These evaluations will be documented on a soil judging form and turned in for a grade. Additional visual interpretations will be made through experiments done by the student individually and in teams, and demonstrations in the lab. Knowledge gained from these interpretations will be tested through weekly lab quizzes. The lab report over their soil sample will be developed into an interpretive oral report that will be given during the last laboratory and will constitute their last lab grade.

Empirical and Quantitative Skills (to include the manipulation and analysis of numerical data or observable facts resulting in informed conclusions):

Numerous calculations will be demonstrated and required for the students to make based upon data presented in lecture and in laboratory exercises. Examples of calculations are soil bulk density, particle density, total porosity, volumetric water content, nutrient concentrations in extracts, recommended nutrient rates of application based upon extractable nutrients and crop and yield goal, etc. Graphs are presented in laboratory and students must interpret data based upon the graphs, such as pH vs % Base Saturation. Data is presented and students must develop a graph to answer questions related to volumetric water content and plant available water.

Teamwork (to include the ability to consider different points of view and to work effectively with others to support a shared purpose or goal):

There are several laboratory exercises where students will work in pairs to evaluate data. During the field trip, students will work in groups of 3 to 5 to evaluate the soil characteristics observed in the soil pit. This information will then be used to interpret potential uses for the soil. Types of evaluations will be road construction, suitability of the site for a conventional septic system, home construction site with or without a basement, potential for growing different crops and conservation measures that would need to be implemented. This exercise is one of the written reports.

Please be aware that instructors should be prepared to submit samples/examples of student work as part of the future course recertification process.
SCSC 301 Soil Science
SYLLABUS
Fall 2014

SCSC 301 – Soil Science. Credits 4 (3 credit hours lecture, 1 credit hour lab). Evaluation of the nature and properties of soils; explanation of the various soils, their components, and their roles in the environment using scientific methods and technology. Prerequisite: Junior or Senior Classification or Approval of Instructor.

LEARNING OBJECTIVES: The student in SCSC 301 will:
1. Describe and quantify fundamental soil physical, chemical, biological and mineralogical properties and explain how properties impact natural and agricultural ecosystems;
2. Describe the formation of soils as they relate to their environment, their description, and their classification;
3. Define and describe the role of soils in infiltration, percolation, and storage of water;
4. Explain the role of macro- and micro-organisms in soil, their function and their requirements; and
5. Identify and describe the biogeochemical cycles of soil-provided plant essentials nutrients.

A. LECTURE: Dr. Sam Feagley, Room 350C, Heep Center; Office Phone - 845-1460
   E-mail:sfeagley@ag.tamu.edu; lecture notes on the web at http://samfeagley.tamu.edu/ (additional information will be provided in class).
   1. Time: MWF 11:30 - 12:20
   2. Place: Room 101 Heep Center
   3. Seating: Assigned on the second day of class
   4. Attendance: No penalty for absences other than on days of announced exams and the missed opportunity to take bonus point quizzes. Bonus point opportunities will not be made-up, except in the case of University Excused Absences. Students are encouraged to read the Student Rule covering class attendance and absence at http://student-rules.tamu.edu/rule07 . In summary, the student is responsible for providing satisfactory evidence to the instructor to substantiate the reason for absence. Excusable absences are: (1) participating in a university authorized activity; (2) death or major illness in the student’s immediate family; (3) illness to a dependent family member; (4) participation in legal proceedings that require the student’s presence; (5) religious holy day; (6) illness too severe or contagious to attend; (7) required participation in military duties; (8) mandatory admission interviews for professional or graduate school which cannot be rescheduled. Students shall inform the instructor of an absence prior to the absence, if feasible; otherwise, the student must notify the instructor within 2 working days of the first day of absence.
   5. Assignment: Given on class schedule and intended to be read prior to lecture on the topic. Before each lecture, students are expected to read instructional objectives for each topic, which are found on pages 108-118 of lab manual.


Technicians for Undergraduate Instruction - Kathy Schmitt and Linda Carpenter.

2. Place: Room 113 Heep Center
3. Attendance: Required. Make-up quizzes may be taken only by students who inform their instructor, me or my office of the need to miss a lab before, if possible, they miss it or in cases of physical inability to make such notification for excused absences.
4. Grading: Session quizzes (100 points each) and two lab reports (100 points each) (75%) and soil sample report (25%). The two lab reports are both written and one will also be an oral presentation. The lowest two quiz grades will not be included in calculation of quiz averages.

C. GRADING SYSTEM
1. Lecture: Four 1 hour exams = 60% of final grade.
2. Laboratory: 20% of final grade (COMPLETION OF SOIL SAMPLE REPORT IS A COURSE
3. **Final Examination:** 20% of final grade. Students having an 89.5 or better average for the four lecture exams and perfect attendance during the last week of classes will be exempted from the final exam. For students exempting the final, lecture exams are 75% of final grade and laboratory is 25% of final grade.

4. **Bonus Points:** Unannounced one question quizzes will be given during lecture sessions approximately 20 times during the semester. Each quiz, correctly answered, will add 0.2 to the final average for the course.

5. **Letter grades for the course will be assigned based on the following scale:** 88 and above – A; 78 to 87 – B; 68 to 77 – C; 58 to 67 – D; less than 58 – F.

D. **SOIL SAMPLE:** A soil sample must be obtained by each student for use in the laboratory. Each student **must use a sample obtained independently of other student samples.** The sample must be air-dry and ground to less than 2 mm in diameter (no. 10 sieve), except for three to four clods 3 or 4 cm in diameter, which should be saved. Samples should be obtained from arable or rangeland soils using an acceptable sampling method (see http://soiltesting.tamu.edu for soil collection methods using Soil Submittal Form or Urban Soil Submittal Form) as discussed during the first laboratory period. The sample should be ready for use as soon as possible, but no later than the lab of September 3-4.

E. **STUDY MATERIALS**


F. **SOIL SAMPLE REPORT:** This report will constitute one-fourth of the laboratory grade (See page 171 in the lab manual). The completed report will be due at the end of your last laboratory period. The **location of the sampled soil must be specified - county, nearest town, exact location with respect to roads, etc.** All blanks on the report must be completed properly and on time for a maximum grade of 100. Each student **must use a different sample and all of data must be collected independently.** Copied or fraudulent data on any **single item** of the report means that a grade of zero will be given for the report and that disciplinary action for cheating may be initiated. If the soil report is not turned in, the course grade will be one letter grade lower than it otherwise would have been.

G. **FIELD TRIPS:** One field trip will be taken during a regular lab period and is required. A fee to cover the field trip was billed to you on registration for the class.

**USE OF OTHER TEACHING RESOURCES IN SCSC 301 - SOIL SCIENCE**

Several resources are available to supplement the standard lecture-lab format in the following ways:

1. A complete set of the power point slides is posted on the web at: [http://samfeagley.tamu.edu](http://samfeagley.tamu.edu). Details for accessing the site will be given in class. Also, two old exams will be posted prior to each hour exam. Audio files that review all teaching objectives of Exam 1-4 are available on the website.

2. Slides, models and monoliths – Difficult to teach concepts such as soil development and classification and mineral structures are presented in summary form using visual aids, some of which are suitable for individual study but not for use in a lecture room. These materials are used in conjunction with discussion of instructional objectives. They will be made available as needed throughout the session.

**CONCLUSION:** The emphasis is on mastery of the course objectives - by whatever means you choose. Course objectives are found in the Laboratory Manual pages 108-118. Several alternative means of acquiring the same knowledge will be provided. Instructional objectives will be treated in two or more of the following ways: a) lecture; b) textbook; c) problem set; d) laboratory exercise; e) slides, models and monoliths; f) coverage of objectives on the web based virtual classroom. **All theory objectives are covered in lecture;** if the lecturer misses one on a topic, remind him as he completes coverage of the topic and asks for questions. Different students rely on different methods of mastering the objectives. Some rely primarily on lecture notes. Most students who make A's
have very few "cuts;" almost all students who make Fs have many "cuts." Enough said! Some make good use of
the text. Some rely on a combination of all the methods available. Whatever means you choose, the secret to
success is keeping yourself current with coverage of objectives in the course. Master them as we go; ask
questions as needed.

ADA (Americans with Disabilities Act) Statement

The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive
civil rights protection for persons with disabilities. Among other things, this legislation requires that all students
with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their
disabilities. If you believe that you have a disability requiring an accommodation, please contact Disability Services
in Cain Hall Room B118 or call 979-845-1637 (http://disability.tamu.edu).

Academic Integrity Statement and Policy

All students are expected to conform to the Honor Council Rules and Procedures (http://aggiehonor.tamu.edu) and
adhere to the Aggie Code of Honor – “An Aggie does not lie, cheat or steal, or tolerate those who do”.
<table>
<thead>
<tr>
<th>DATE</th>
<th>DAY</th>
<th>LECTURE TOPIC</th>
<th>TEXT ASSIGNMENT</th>
<th>LAB SCHEDULE BY EXERCISE</th>
</tr>
</thead>
<tbody>
<tr>
<td>8/26</td>
<td>1</td>
<td>Course organization and introduction</td>
<td></td>
<td>Tue. 8/27 - Wed. 8/28 * Soils &amp; soil materials</td>
</tr>
<tr>
<td>8/28</td>
<td>2</td>
<td>Soils as natural bodies</td>
<td>1:1-26, 2:52-56</td>
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<tr>
<td>8/30</td>
<td>3</td>
<td>Origin and nature of parent materials</td>
<td>2:27-32</td>
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<tr>
<td>9/2</td>
<td>4</td>
<td>Classification of parent materials</td>
<td>2:32-43</td>
<td>Tue. 9/3 - Wed. 9/4 * Physical characterization of soils - Part I *Items 1,2&amp;4 due</td>
</tr>
<tr>
<td>9/4</td>
<td>5</td>
<td>Primary particles in soils</td>
<td>4:96-104</td>
<td></td>
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<tr>
<td>9/6</td>
<td>6</td>
<td>Secondary particles in soils</td>
<td>4:104-123</td>
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<tr>
<td>9/9</td>
<td>7</td>
<td>Physical measurements in soils</td>
<td>4:123-131</td>
<td>Tue. 9/10 - Wed. 9/11 * Physical characterization of soils - Part II *Item 5 due</td>
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<tr>
<td>9/11</td>
<td>8</td>
<td>Soil air and soil temperature</td>
<td>7:201-234</td>
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<tr>
<td>9/13</td>
<td>9</td>
<td>Soil water concepts</td>
<td>5:132-164</td>
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<td>9/16</td>
<td>10</td>
<td>Soil water energy</td>
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<td>Tue. 9/17 - Wed. 9/18 * Soil water Item 6,7&amp;8 due</td>
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<td>9/18</td>
<td>11</td>
<td>Movement of water in soils</td>
<td></td>
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<tr>
<td>9/20</td>
<td>12</td>
<td>Vapor and liquid losses of soil water</td>
<td>6:165-200</td>
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<tr>
<td>9/23</td>
<td>13</td>
<td>Soil drainage</td>
<td></td>
<td>Tue. 9/24 - Wed. 9/25 * Fertilizing soils</td>
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<td>9/25</td>
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<tr>
<td>9/27</td>
<td>15</td>
<td>Soil erosion</td>
<td>14:499-534</td>
<td></td>
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<tr>
<td>9/30</td>
<td>16</td>
<td>Soil formation - variables involved</td>
<td>2:32-57</td>
<td>Tue. 10/1 - Wed. 10/2 * Soil erosion and conservation</td>
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<tr>
<td>10/2</td>
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<td>Soil development, horizonation</td>
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<tr>
<td>10/4</td>
<td>18</td>
<td>Soil classification</td>
<td>3:58-87</td>
<td>Tue. 10/8 - Wed. 10/9 * Soil formation, classification &amp; land judging, field trip</td>
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<tr>
<td>10/7</td>
<td>19</td>
<td>The soil orders, their occurrence</td>
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<tr>
<td>10/9</td>
<td>20</td>
<td>Classification and soil survey</td>
<td>3:88-95</td>
<td>Tue. 10/12 - Wed. 10/16 *Soil survey * Items 3due</td>
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<tr>
<td>10/11</td>
<td>21</td>
<td>Chemical reactivity in soils</td>
<td>8:235-240</td>
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<tr>
<td>10/14</td>
<td>22</td>
<td>Expression of cation exchange capacity</td>
<td>8:252-268</td>
<td>Tue. 10/12 - Wed. 10/16 *Soil survey * Items 3due</td>
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<tr>
<td>10/16</td>
<td>23</td>
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<td>10/18</td>
<td>24</td>
<td>Structure and genesis of clays</td>
<td>8:240-251</td>
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<tr>
<td>10/21</td>
<td>25</td>
<td>Other colloids and properties</td>
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<td>10/23</td>
<td>26</td>
<td>Life in the soil</td>
<td>10:322-360</td>
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<td>10/25</td>
<td>27</td>
<td>Genesis of organic matter</td>
<td>11:361-395</td>
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<tr>
<td>Date</td>
<td>Lecture Days</td>
<td>Topic</td>
<td>Time</td>
<td>Notes</td>
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<tr>
<td>10/28</td>
<td>28</td>
<td>Comp. and distribution of organic matter</td>
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<tr>
<td>10/30</td>
<td>29</td>
<td>Soil pH, soil acidity</td>
<td>9:269-291</td>
<td>* Soil organisms and organic matter</td>
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<td>* Item 10 due</td>
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<td>11/1</td>
<td>30</td>
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<td>9:291-301</td>
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<td>11/4</td>
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<td>9:288-296</td>
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<td>11/8</td>
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<td>11/13</td>
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<td>12:412-420</td>
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<td>11/15</td>
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<td>11/20</td>
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<td>11/27</td>
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<td>13:455-475</td>
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<td><strong>THANKSGIVING HOLIDAY</strong></td>
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<tr>
<td>12/2</td>
<td>42</td>
<td>Soil &amp; environment concerns (Friday classes)</td>
<td>15:535-565</td>
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</tr>
</tbody>
</table>

**FINAL EXAM:** Wednesday 12/11, 10:30 am - 12:30 pm OTHER TIMES BY ARRANGEMENT ONLY

**SCSC 301 LECTURE EXAM OBJECTIVES**

*(See Lab Manual, p. 108-118)*

**EXAM 1 - (Web days 1-12)**
- Introduction, Weathering and Parent Materials, *except objective 11*
- Physical Properties of Mineral Soils, *except objectives 2 and 3*
  - Soil Air
  - Soil Temperature
  - Soil Water – (Objectives 1, 2, 3, 5, 6, 7, 11, 12)

**EXAM 2 - (Web days 13-20)**
- Soil Water – (Objectives 4, 8-10, 13-21)
- Soil Formation
- Soil Classification
- Soil Survey

**EXAM 3 - (Web days 21-30)**
- Chemical Properties
- Mineralogical Properties
- Soil Organisms
Soil Organic Matter
Soil pH - (Objectives 1-10)

EXAM 4 - (Web days 31-39)
Soil pH - (Objectives 11-13)
Adjustment of Soil pH (Liming)
Soil Nitrogen, Sulfur
Soil Phosphorus
Soil Potassium (except objective 3)
Other Macronutrients, Micronutrients, and Nutrient Management
Texas A&M University
Core Curriculum Cover Sheet
Initial Request for a course to be considered for the Fall 2014 Core Curriculum

1. This request is submitted by (department name): Soil and Crop Sciences

2. Course prefix and number: SCSC 405

3. Texas Common Course Number: N/A

4. Complete course title: Soil and Water Microbiology

5. Semester credit hours: 4

6. This request is for consideration in the following Foundational Component Area:

☐ Communication
☐ Mathematics
☒ Life and Physical Sciences
☐ Language, Philosophy and Culture
☐ Creative Arts
☐ American History
☐ Government/Political Science
☐ Social and Behavioral Sciences

7. This course should also be considered for International and Cultural Diversity (ICD) designation:

☐ Yes  ☒ No

8. How frequently will the class be offered? Fall and spring

9. Number of class sections per semester: 4

10. Number of students per semester: 40

11. Historic annual enrollment for the last three years: 82  127  116

This completed form must be attached to a course syllabus that sufficiently and specifically details the appropriate core objectives through multiple lectures, outside activities, assignments, etc. Representative from department submitting request should be in attendance when considered by the Core Curriculum Council.

12. Submitted by:

[Signature]
Course Instructor

[Signature]
Date 8/13/13

Approvals:

[Signature]
Department Head

[Signature]
Date 8/13/13

[Signature]
College Dean/Designee

[Signature]
Date 8/14/13

For additional information regarding core curriculum, visit the Texas Higher Education Coordinating Board website at www.thecb.state.tx.us/corecurriculum2014

See form instructions for submission/approval process.
Texas A&M University
Core Curriculum
Initial Request for a Course Addition to the Fall 2014 Core Curriculum

Foundational Component Area: Life and Physical Sciences

In the box below, describe how this course meets the Foundational Component Area description for Life and Physical Sciences. Courses in this category focus on describing, explaining, and predicting natural phenomena using the scientific method. Courses involve the understanding of interactions among natural phenomena and the implications of scientific principles on the physical world and on human experiences.

The proposed course must contain all elements of the Foundational Component Area. How does the proposed course specifically address the Foundational Component Area definition above?

The course focuses upon describing, explaining, and predicting the interactions of microorganisms with their physical environment and the resulting impacts of these microorganisms on natural phenomena including: the sustainability and productivity of various ecosystems; nutrient cycling; degradation of pesticides and other xenobiotics; generation of trace gases; and soil and water quality. The laboratory portion of the course will reinforce these concepts and provide hands-on experience with using the scientific method and current analytical techniques to describe, explain, understand, and predict the impacts of soil and water microorganisms on the physical world and human experiences, with an emphasis on the natural phenomena listed above.

Core Objectives

Describe how the proposed course develops the required core objectives below by indicating how each learning objective will be addressed, what specific strategies will be used for each objective and how student learning of each objective will be evaluated.

The proposed course is required to contain each element of the Core Objective.

Critical Thinking (to include creative thinking, innovation, inquiry, and analysis, evaluation and synthesis of information):

How addressed:
The critical thinking objective is largely accomplished through the laboratory portion of the course and discussion of case studies in the lecture. This includes the students conducting inquiry-based laboratory experiments followed by collection, evaluation, and synthesis of the results. In addition, case studies are included in the lecture portion of the course to encourage students to synthesize covered topics and critically evaluate the approaches and results from the case studies and to develop innovative approaches to answer scientific questions.

Strategies:
Students will evaluate and interpret case studies and their laboratory experiments and use this information to predict how these results would translate to other scenarios. For example, students will conduct a laboratory experiment in which they monitor carbon dioxide evolution from soils in response to amendment with plant materials having different carbon/nitrogen ratios. Following the experiment, students will be asked to use their results to predict the impact of different cropping systems on the levels of carbon dioxide released from soils under various scenarios.

How evaluated:
Questions will be included on quizzes, exams, and laboratory data sheets to verify the student’s ability to answer questions requiring critical thinking.
Texas A&M University

Core Curriculum

Initial Request for a Course Addition to the Fall 2014 Core Curriculum

Communication (to include effective development, interpretation and expression of ideas through written, oral and visual communication):

How addressed:
Effective written communication is demonstrated using exams, lab datasheets, etc. In addition, written, oral, and visual communication is demonstrated by PowerPoint presentations.

Strategies:
Students will answer discussion questions on exams and lab datasheets which will evaluate their ability to interpret a scenario and express their conclusions in a logical manner. In addition, the students will give PowerPoint presentations for selected laboratory experiments. These presentations will allow the students to demonstrate their ability to effectively develop a presentation, interpret their laboratory results, and express their conclusions. The presentations will include photos and graphical and tabular expressions of their results.

How evaluated:
Discussion questions on exams and lab datasheets along with PowerPoint presentations on their laboratory experiments will be used to verify that the students can develop, interpret, and express their ideas through written (exams & presentations), oral (presentations), and visual (presentations) communication. A rubric will be used to assess the PowerPoint presentations.

Empirical and Quantitative Skills (to include the manipulation and analysis of numerical data or observable facts resulting in informed conclusions):

How addressed:
Students will conduct laboratory experiments and then collect, analyze, and interpret their results.

Strategies:
Students will collect, manipulate, and analyze numerical data and other observable results from their laboratory experiments. For example, students will conduct a microbial respiration experiment in which they will quantify the amount of carbon dioxide released from soil following amendment with different plant materials. Using a titration-based method, students will calculate how much carbon dioxide was produced at each measurement time-point and then graph these results for comparison among treatments and across lab groups. Following the experiment, students will be asked to use their results to predict the impact of different cropping systems on the levels of carbon dioxide released from soils under various scenarios.

How evaluated:
The student’s empirical and quantitative skills will be evaluated via questions and calculations on laboratory datasheets, quizzes, presentations, and a lab practical.

Teamwork (to include the ability to consider different points of view and to work effectively with others to support a shared purpose or goal):

How addressed:
Students will work as groups of 2-3 people in the laboratory portion of the course.

Strategies:
Lab exercises are done as groups of 2-3 people. This requires the students to coordinate activities to conduct the experiments, interpret the results, and present them to the class. Additional group activities (e.g., discussion of case studies) occur in both the lecture and lab portions of the course.
Texas A&M University

Core Curriculum

Initial Request for a Course Addition to the Fall 2014 Core Curriculum

How evaluated:
The student’s ability to effectively work as part of a team will be evaluated based upon his/her performance conducting the laboratory exercises and group lab presentations. The instructor will consider peer-evaluation feedback from the student’s other group members in making the evaluation.

Please be aware that instructors should be prepared to submit samples/examples of student work as part of the future course recertification process.
Course title and number: Soil and Water Microbiology - SCSC 405
Term: Fall 2013
Class times: Lecture - MWF 10:20-11:10 AM; Lab T or W (times listed below)
Class location: Lecture – Heep Center 103; Lab – Heep Center 532

Course Description and Prerequisites
Course Description: In this course, we will discuss the roles of soil and water microorganisms in the sustainability and productivity of various ecosystems with specific emphasis on plant-microbial interactions, nutrient cycling, degradation of pesticides and other xenobiotics, generation of trace gases, and soil and water quality. The laboratory portion of the course will reinforce these concepts and provide hands-on experience with current techniques in soil and water microbiology. Prerequisites include: Junior or Senior classification, or approval of instructor.

Learning Outcomes or Course Objectives
After completing the course, each student will be able to:
1. Describe the types, abundance, diversity, and distribution of microorganisms in soil and water environments.
2. Explain the roles of microorganisms in various soil, water, and plant processes, including the biogeochemical cycling of carbon, nutrients, and other elements.
3. Explain how soil microbial properties and processes are impacted by, and impact upon, soil physical and chemical properties.
4. Discuss how soil microbial properties affect the sustainability and productivity of managed and natural ecosystems, and water quality.
5. Discuss potential beneficial and detrimental effects of microorganisms on environmental quality.

Instructor Information
Name: Terry Gentry
Telephone number: 979-845-5323
Email address: tgentry@ag.tamu.edu
Office hours: MW 11:10 AM – noon; W 3:00 - 3:50 PM; other hours by appointment
Office location: Heep 550A

Textbook and/or Resource Material
Lab manual: Laboratory exercises posted on course website
Class website: https://lms.tamu.edu/webct/logon/6366520602011
Optional note-set: Available at Notes-n-Quotes
Attendance Policy

"The University views class attendance as the responsibility of an individual student. Attendance is essential to complete the course successfully. University rules related to excused and unexcused absences are located online at http://student-rules.tamu.edu/rule07."

Lecture:
Your regular attendance in class is among my expectations of you in this course! Class starts promptly at 10:20 AM. Please be in your seats by that time and prepared to start the class period. Attending lectures enables you to gain proper context, or "spin", for the information, issues, etc., discussed in class. While I will use the SCSC 405 website to post class materials, this is not designed to take the place of the lecture portion of the class.

Laboratory:
Labs will begin during the first week of classes. Attendance in the laboratory is mandatory. Please do your best to not miss a lab period. It might be possible that we can have you attend a different lab section but this should not be a regular occurrence. If you need to attend a different laboratory section for a given week, please contact your laboratory instructor prior to doing so. It is nearly impossible to make up missed labs since most of the materials are only available during the week of that lab. Missing a lab also puts undo strain on your lab partner. We will appreciate knowing in advance, if possible, if you are unable to attend a lab.

General Information
Welcome to SCSC 405 - An Introduction to Soil and Water Microbiology! During the semester you will be introduced to the major microbial groups that live in the soil and you will develop an understanding of the uniqueness of the soil and water as environments for microbes as well as some larger organisms. I will try to instill in you an appreciation for the vast array of processes carried out by microbes and how those processes serve to keep the planet a habitable space for humans and other life forms. You will experience a world that few people ever get to view or are even aware that it exists; unless they experience some unpleasant encounter with an "unfriendly" microbe. You will discover that the overwhelming majority of microbes could care less about us humans and that some are downright beneficial, if not essential, to our well-being as individuals, and as just one species among many sharing the planet with a myriad of other organisms, large and small.

At the conclusion of this course you should be able to put into proper context claims made by various groups regarding the benefits of applications of microbial preparations (inoculants, etc.) for a range of practical applications. You should definitely have expanded your knowledge about the unseen life that lies in, on and around you on a daily basis. I hope you enjoy the mystery microbe tour as it unfolds before you.
Grading Policies

Lecture Evaluation Criteria:
1. Quizzes (20 @ 5 pts each) = 100 points*
2. Exams (3 @ 150 pts each) = 450 points**
3. Final exam = 150 points***

Laboratory Evaluation Criteria:
1. Quizzes (10 @ 10 pts each) = 100 points*
2. Datasheets (.5 @ 10 pts each) = 150 points
3. Group lab presentations (2 @ 10 pts each) = 20 points
4. Pre-practical quiz = 30 points
5. Practical = 100 points

Total = 1,100 points

Grading Scale:

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<tr>
<th>Points</th>
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<th>Grade</th>
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<tbody>
<tr>
<td>≥990</td>
<td>(≥90%)</td>
<td>A</td>
</tr>
<tr>
<td>880-989</td>
<td>(80 - 89%)</td>
<td>B</td>
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<tr>
<td>770-879</td>
<td>(70 - 79%)</td>
<td>C</td>
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<td>660-769</td>
<td>(60 - 69%)</td>
<td>D</td>
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<td>&lt;659</td>
<td>(&lt;60%)</td>
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* There may be >20 lecture quizzes and >10 laboratory quizzes. Your top 20 lecture quiz grades and top 10 lab quiz grades will be included in your final course grade. In other words, you may be able to drop one (or possibly a few) of your quiz grades.

** Approximately 10% of the questions (points) on Exams 2 & 3 will be questions from previous exams (i.e., Exams 2 & 3 will be comprehensive).

*** The final exam will be comprehensive and is optional. If the final exam is not taken, your final grade for the course will be determined using the % breakdown given for the grading scale above adjusted to a total of 950 points possible.

If you have concerns about your grade at any time during the semester, you should visit with me as soon as possible to see what you might do to improve your performance.
<table>
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<tr>
<th>Lecture Period</th>
<th>Month</th>
<th>Date</th>
<th>Day</th>
<th>Chapter/Readings</th>
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<tr>
<td>1</td>
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<td>26</td>
<td>M</td>
<td>1</td>
<td>Introduction</td>
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<td>2</td>
<td>Aug</td>
<td>28</td>
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<td>2,11</td>
<td>The Soil and Rhizosphere Environment</td>
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<td>3</td>
<td>Aug</td>
<td>30</td>
<td>F</td>
<td>2,11</td>
<td>The Soil and Rhizosphere Environment</td>
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<td>4</td>
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<td>2</td>
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<td>5</td>
<td>Bacteria</td>
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<td>Bacteria, Actinomycetes, and Archaea</td>
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<td>6</td>
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<td>F</td>
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<td>8</td>
<td>Protozoa and Macrofauna</td>
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<td>Sep</td>
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<td>W</td>
<td>8, 9</td>
<td>Protozoa and Viruses</td>
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<td>Sep</td>
<td>20</td>
<td>F</td>
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<td>3, 4</td>
<td>Microbial Metabolism &amp; Soil Enzymes</td>
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<td>Microbial Metabolism &amp; Soil Enzymes</td>
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<td>18</td>
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<td>13 &amp; Notes</td>
<td>Degradation of Cellulose &amp; Hemicellulose</td>
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<td>13 &amp; Notes</td>
<td>Degradation of Cellulose, Hemicellulose &amp; Other Polymers</td>
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<td>13 &amp; Notes</td>
<td>Degradation of Lignin</td>
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<td>13, 23</td>
<td>Soil Organic Matter Formation and Decomposition</td>
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<td>13, 23</td>
<td>Soil Organic Matter Formation and Decomposition</td>
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<td>Microbial Transformations of Hydrocarbons/Bioremediation</td>
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<td>20, 21 &amp; Notes</td>
<td>Microbial Transformations of Hydrocarbons/Bioremediation</td>
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<tr>
<td>25</td>
<td>Nov</td>
<td>21</td>
<td>M</td>
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<td><em><strong>SECOND HOUR EXAM</strong></em></td>
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<td>26</td>
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<td>23</td>
<td>W</td>
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<td>Exam 2 Postmortem</td>
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<td>27</td>
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<td>14</td>
<td>Mineralization and Immobilization of Nitrogen</td>
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<td>14</td>
<td>Mineralization and Immobilization of Nitrogen</td>
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<td>29</td>
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<td>W</td>
<td>14</td>
<td>Nitrification &amp; Denitrification</td>
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<td>Nitrification &amp; Denitrification</td>
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<td>31</td>
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<td>15</td>
<td>N₂-Fixation: Non-Symbiotic</td>
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<td>15 &amp; 16</td>
<td>N₂-Fixation: Non-Symbiotic &amp; Symbiotic</td>
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<td>33</td>
<td>Nov</td>
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<td>F</td>
<td>16</td>
<td>N₂-Fixation: Symbiotic</td>
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<td>34</td>
<td>Nov</td>
<td>11</td>
<td>M</td>
<td>17</td>
<td>Microbial Transformations of Sulfur, Iron, Arsenic &amp; Other Elements</td>
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<tr>
<td>35</td>
<td>Nov</td>
<td>13</td>
<td>W</td>
<td>20, Notes, Handouts</td>
<td>Microbiological Aspects of Pesticides</td>
</tr>
<tr>
<td>36</td>
<td>Nov</td>
<td>15</td>
<td>F</td>
<td>Notes, Handouts</td>
<td>Nontraditional Soil Amendments - &quot;Biotransformers&quot; and &quot;Inoculants&quot; a.k.a. &quot;Miracle Products&quot;</td>
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<tr>
<td>37</td>
<td>Nov</td>
<td>18</td>
<td>M</td>
<td>Notes, Handouts</td>
<td>Soil and Water Quality</td>
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<tr>
<td>38</td>
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<td>W</td>
<td>Notes, Handouts</td>
<td>Soil and Water Quality</td>
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<td><em><strong>THIRD HOUR EXAM</strong></em></td>
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<td>25</td>
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<td>Exam 3 Postmortem</td>
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<tr>
<td>41</td>
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<td><em><strong>LAB PRACTICAL FOR ALL LAB SECTIONS (Heep 103)</strong></em></td>
</tr>
<tr>
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<td></td>
<td>29</td>
<td>F</td>
<td>18</td>
<td>No class - Thanksgiving Holiday</td>
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<tr>
<td>42</td>
<td>Dec</td>
<td>2</td>
<td>M</td>
<td></td>
<td>Wrap-up &amp; Review</td>
</tr>
<tr>
<td>Dec</td>
<td></td>
<td>10</td>
<td>T</td>
<td></td>
<td><em><strong>FINAL EXAM - 8:00-10:00 AM</strong></em></td>
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</tbody>
</table>
SOIL AND WATER MICROBIOLOGY - SCSC 405 - LAB SCHEDULE - FALL 2013
Heep Center Room 532

Sections: Times Instructors:
Sect. 501 - Tuesday 9:30-11:30 AM Kaya Howard (khoward@neo.tamu.edu)
Sect. 502 - Tuesday 12:15-2:45 PM Kaya Howard (khoward@neo.tamu.edu)
Sect. 503 - Tuesday 3:15-5:15 PM Tina Barrera (tinab12@tamu.edu)
Sect. 504 - Wednesday 1:00-3:00 PM Tina Barrera (tinab12@tamu.edu)

<table>
<thead>
<tr>
<th>WEEK</th>
<th>DATES</th>
<th>EXERCISE</th>
<th>TITLE OR ACTIVITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Aug. 27, 28</td>
<td>Lab Intro</td>
<td>Laboratory safety and proper use of pipettes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Begin Ex. 1</td>
<td>The compound microscope use of the oil immersion technique</td>
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<tr>
<td></td>
<td></td>
<td>Begin Ex. 2</td>
<td>The ubiquity of microbial life and the need for aseptic technique</td>
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<tr>
<td></td>
<td></td>
<td>Begin Ex. 3</td>
<td>Observation of unstained bacteria</td>
</tr>
<tr>
<td>2</td>
<td>Sep. 3, 4</td>
<td>Compl. Ex. 2</td>
<td>Observe culture plates from Exercise 2 of the previous week</td>
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<tr>
<td></td>
<td></td>
<td>Begin Ex. 4</td>
<td>The Gram stain technique - an example of a differential staining technique</td>
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<tr>
<td>3</td>
<td>Sep. 10, 11</td>
<td>Begin Ex. 5</td>
<td>Enumeration of soil bacteria and actinomycetes using spread plate methods</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Begin Ex. 10</td>
<td>The contact slide: observation of spatial relations of soil microbes in situ</td>
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<tr>
<td></td>
<td></td>
<td>Begin Ex. 12</td>
<td>The Winogradsky column - a demonstration of microbial succession</td>
</tr>
<tr>
<td>4</td>
<td>Sep. 17, 18</td>
<td>Begin Ex. 6</td>
<td>Soil fungi: enumeration on selective media and observation of common fungal genera</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Cont. Ex. 10</td>
<td>Remove contact slides for staining</td>
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<tr>
<td></td>
<td></td>
<td>Ccmpl. Ex. 5</td>
<td>Count bacterial colonies from previous week</td>
</tr>
<tr>
<td>5</td>
<td>Sep. 24, 25</td>
<td>Ccmpl. Ex. 6</td>
<td>Count fungal colonies on both media. Observe microscopic details of fresh materials and prepared slides</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Begin Ex. 7</td>
<td>Soil algae and cyanobacteria: enumeration by the most-probable-number technique</td>
</tr>
<tr>
<td>6</td>
<td>Oct. 1, 2</td>
<td>Begin Ex. 8</td>
<td>Nematodes: demonstration of the Baermann funnel and observation of live material and prepared slides</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Begin Ex. 9</td>
<td>Nematode-trapping fungi - set-up microcosms on corn meal-extract agar</td>
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<tr>
<td></td>
<td></td>
<td>Begin Ex. 11</td>
<td>Soil respiration: measurement of carbon dioxide evolution</td>
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<tr>
<td></td>
<td></td>
<td>Begin Ex. 13</td>
<td>Enumeration and observation of cellulose-decomposing microorganisms</td>
</tr>
<tr>
<td>7</td>
<td>Oct. 8, 9</td>
<td><strong>Begin Ex. 14</strong></td>
<td>Hydrolysis of starch (polysaccharide) and casein (protein) by bacterial isolates (demonstration of extracellular enzymes)</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Begin Ex. 15</strong></td>
<td>Ammonification (nitrogen mineralization) by bacteria</td>
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<td><strong>Begin Ex. 17</strong></td>
<td>Denitrification by bacteria</td>
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<tr>
<td></td>
<td></td>
<td>Ccmpl. Ex. 10</td>
<td>Contact slides: observe and record observations</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Cont. Ex. 9</td>
<td>Search for nematode trappers</td>
</tr>
</tbody>
</table>

***Experiments marked with asterisks indicate that you will have to return to the lab on the following day to carry out some brief manipulation.***

### The Aggie Honor Code

Upon accepting admission to Texas A&M University, a student immediately assumes a commitment to uphold the Honor Code, to accept responsibility for learning and to follow the philosophy and rules of the Honor System. Students will be required to state their commitment on examinations, research papers, and other academic work. Ignorance of the rules does not exculpate any member of the Texas A&M University community from the requirements or the processes of the Honor System. For additional information please visit: [http://aggiehonor.tamu.edu](http://aggiehonor.tamu.edu)

The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact Disability Services, in Cain Hall, Room B118, or call 845-1637. For additional information visit [http://disability.tamu.edu](http://disability.tamu.edu).
<table>
<thead>
<tr>
<th>WEEK</th>
<th>DATES</th>
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<th>TITLE OR ACTIVITY</th>
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</thead>
<tbody>
<tr>
<td>8</td>
<td>Oct. 15, 16</td>
<td>Compl. Ex. 11</td>
<td>Titrate remaining flasks in CO₂ evolution (soil respiration) study</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Compl. Ex. 14</td>
<td>Read starch and milk agar plates for zones of hydrolysis around streaks</td>
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<tr>
<td></td>
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<td>Compl. Ex. 15</td>
<td>Read ammonification tubes; check for ammonium with Nessler's reagent (appendix B)</td>
</tr>
<tr>
<td></td>
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<td>Compl. Ex. 17</td>
<td>Read nitrate broth tubes for denitrification; check for gas production</td>
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<tr>
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<td></td>
<td>Cont. Ex. 9</td>
<td>Search for nematode trappers</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Begin Ex. 23</td>
<td>Weigh out soil for enzyme assays (use soil from Ex. 11)</td>
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<tr>
<td></td>
<td></td>
<td>Compl. Ex. 9</td>
<td>Search for nematode trappers</td>
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<tr>
<td></td>
<td></td>
<td>Cont. Ex. 23</td>
<td>Conduct soil enzyme assays</td>
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<tr>
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<td>Begin Ex. 20</td>
<td>Oxidation of sulfur in liquid culture by Acidithiobacillus species</td>
</tr>
<tr>
<td>10</td>
<td>Oct. 29, 30</td>
<td>Begin Ex. 21</td>
<td>Sulfate-reducing bacteria (Desulfovibrio, Desulfotomaculum, etc.)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Compl. Ex. 7</td>
<td>Determine MPN of soil algae and cyanobacteria; observe growth from tubes using simple wet mounts</td>
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<tr>
<td></td>
<td></td>
<td>Cont. Ex. 19</td>
<td>Observe prepared slides of diatoms, Anabaena</td>
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<tr>
<td></td>
<td></td>
<td>Compl. Ex. 23</td>
<td>Examine soil enzyme assay results</td>
</tr>
<tr>
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<td></td>
<td>Compl. Ex. 13</td>
<td>Determine MPN of cellulose decomposers. Make stained smears and observe the organisms associated with the cellulose fibers.</td>
</tr>
<tr>
<td></td>
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<td>Compl. Ex. 21</td>
<td>Observe sulfate-reducer medium for evidence of H₂S production. Make wet mounts from positive tubes and describe some organisms.</td>
</tr>
<tr>
<td>11</td>
<td>Nov. 5, 6</td>
<td>Begin Ex. 22</td>
<td>Enteric bacteria and water quality</td>
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<tr>
<td></td>
<td></td>
<td>Compl. Ex. 13</td>
<td>Observe membrane filter plates</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Compl. Ex. 21</td>
<td>Observe nodulation of your Siratro plants. Record weights of shoots, roots and nodules.</td>
</tr>
<tr>
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<td>Cont. Ex. 20</td>
<td>Check pH values in sulfur medium</td>
</tr>
<tr>
<td>12</td>
<td>Nov. 12, 13</td>
<td>Compl. Ex. 22</td>
<td>Comprehensive &quot;Pre-Practical&quot; Lab Quiz for all lab sections</td>
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<tr>
<td></td>
<td></td>
<td>Compl. Ex. 19</td>
<td>Take final readings on sulfur medium</td>
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<tr>
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<td>Compl. Ex. 20</td>
<td>Final observation of Winogradsky columns</td>
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<tr>
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<td>Cont. Ex. 12</td>
<td>Clean Lab and all drawers. No grade will be given unless this is done!</td>
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<tr>
<td>13</td>
<td>Nov. 19, 20</td>
<td>Compl. Ex. 20</td>
<td><strong>Lab Practical Exam</strong></td>
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<td><strong>Please note:</strong> All lab sections will take the practical exam at the same time in Heep Center Room 103.</td>
</tr>
</tbody>
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